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And 3% of .97 = .02 $\frac{1}{50}$.

$97\% + 2\frac{1}{50}\% = 99\frac{1}{25}\% = \text{cost on repurchasing.}$

Loss is $100\% - (97 - 2\frac{1}{50})\% = 5\frac{1}{50}\%$.

$\therefore 5\frac{1}{50}\% = \$12.00.$

Then $1\% = \$2.0305.$

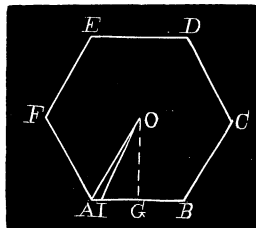
And $100\% = \$203.05.$

4. I. What is the number of acres in a field in the form of a regular hexagon, if it contains as many acres as there are boards in the fence inclosing it, the boards being $l = 8\sqrt{3}$ feet long and the fence $n = 6$ boards high?

Solution by B. F. FINKEL, Professor of Mathematics in Kidder Institute, Kidder, Missouri.

Construction.— Let $ABCDEF$ be the field, O the center, AI the length of a panel of the fence. Connect A and I with the center of the field by the lines AO and IO . Draw OG perpendicular to the side AB . Then

- II. {
1. $AI = 8\sqrt{3}$ feet, and
 2. area of $AOI = 6A = 261360$ sq.ft., since there are as many acres in the field as there are boards in the fence inclosing it and the panel being 6 boards high.
 3. $\frac{1}{2}(AI \times OG) = \text{the area of the triangle } AOI = \frac{1}{2}(8\sqrt{3} \times OG) = 4\sqrt{3} \times OG.$
 4. $\therefore 4\sqrt{3} \times OG = 261360$, the number of square feet in the triangle AOI , whence
 5. $OG = 261360 \div 4\sqrt{3} = \frac{65340}{4\sqrt{3}}.$ But
 6. $OG = \sqrt{[AO^2 (= AB^2) - AG^2 (= \frac{1}{4}AB^2)]} = \frac{1}{2}AB\sqrt{3}.$
 7. $\therefore \frac{1}{2}AB\sqrt{3} = \frac{65340}{4\sqrt{3}},$ whence
 8. $AB = \frac{130680}{\sqrt{3}} \text{ ft., the length of a side of the field. Then}$
 9. $\frac{130680}{\sqrt{3}} \div 8\sqrt{3} = 5445$, the number of panels on a side, and
 10. $6(6 \times 5445) = 196020$, the number of acres in the field.



III. \therefore There are 196020 acres in the field.

Remark.— If we let $l =$ the length of a rail and n , the number of rails in a panel, the number of acres in a hexagonal field will be $174240n^2 \div l^2\sqrt{3}$. From the nature of the problem, n must be integral. \therefore The number of acres and the length of the rails can not both be rational. The above solution is also applicable when the field is in the form of a square.

PROBLEMS.

5. Proposed by E. E. KINNEY, Anaconda, Montana.

A board is 16 in. long and 9 in wide. How may it be cut in two parts that the parts joined together may form a square?